

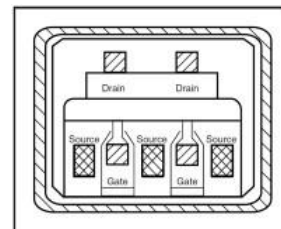
### FEATURES

- High Output Power:  $P_{1dB} = 27.0\text{dBm(Typ.)}$
- High Gain:  $G_{1dB} = 7.0\text{dB(Typ.)}$
- High Power Added Efficiency:  $PAE = 32\%\text{(Typ.)}$
- Proven Reliability

### DESCRIPTION

The FLK057XV chip is a power GaAs FET that is designed for general purpose applications in the Ku-Band frequency range as it provides superior power, gain, and efficiency.

Sumitomo Electric stringent Quality Assurance Program assures the highest reliability and consistent performance.



### ABSOLUTE MAXIMUM RATING (Ambient Temperature $T_a=25\text{deg.C}$ )

| Item                    | Symbol    | Condition              | Rating      | Unit  |
|-------------------------|-----------|------------------------|-------------|-------|
| Drain-Source Voltage    | $V_{DS}$  |                        | 15          | V     |
| Gate-Source Voltage     | $V_{GS}$  |                        | -5          | V     |
| Total Power Dissipation | $P_{tot}$ | $T_c = 25\text{deg.C}$ | 3.75        | W     |
| Storage Temperature     | $T_{stg}$ |                        | -65 to +175 | deg.C |
| Channel Temperature     | $T_{ch}$  |                        | 175         | deg.C |

Sumitomo Electric recommends the following conditions for the reliable operation of GaAs FETs:

1. The drain-source operating voltage ( $V_{DS}$ ) should not exceed 10 volts.
2. The forward and reverse gate currents should not exceed 4.4 and -0.2 mA respectively with gate resistance of 1000ohm.
3. The operating channel temperature ( $T_{ch}$ ) should not exceed 145deg.C.

### ELECTRICAL CHARACTERISTICS (Ambient Temperature $T_a=25\text{deg.C}$ )

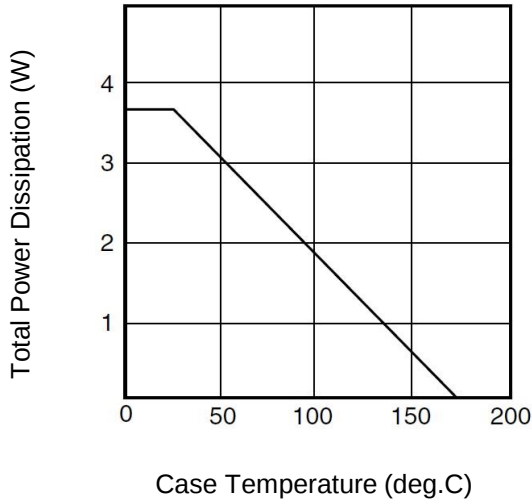
| Item                                       | Symbol    | Test Conditions                                     | Limit |      |      | Unit    |
|--------------------------------------------|-----------|-----------------------------------------------------|-------|------|------|---------|
|                                            |           |                                                     | Min.  | Typ. | Max. |         |
| Saturated Drain Current                    | $I_{DSS}$ | $V_{DS} = 5V, V_{GS} = 0V$                          | -     | 200  | 300  | mA      |
| Transconductance                           | $gm$      | $V_{DS} = 5V, I_{DS} = 125\text{mA}$                | -     | 100  | -    | mS      |
| Pinch-off Voltage                          | $V_p$     | $V_{DS} = 5V, I_{DS} = 10\text{mA}$                 | -1.0  | -2.0 | -3.5 | V       |
| Gate Source Breakdown Voltage              | $V_{GSO}$ | $I_{GS} = -10\mu A$                                 | -5    | -    | -    | V       |
| Output Power at 1dB Gain Compression Point | $P_{1dB}$ | $V_{DS} = 10V$                                      | 26    | 27   | -    | dBm     |
| Power Gain at 1dB Gain Compression Point   | $G_{1dB}$ | $I_{DS} \approx 0.6I_{DSS}$<br>$f = 14.5\text{GHz}$ | 6     | 7    | -    | dB      |
| Power-added Efficiency                     | PAE       |                                                     | -     | 32   | -    | %       |
| Thermal Resistance                         | $R_{th}$  | Channel to Case                                     | -     | 20   | 40   | deg.C/W |

**Note:** RF parameter sample size 10pcs. criteria (accept/reject)=(2/3)

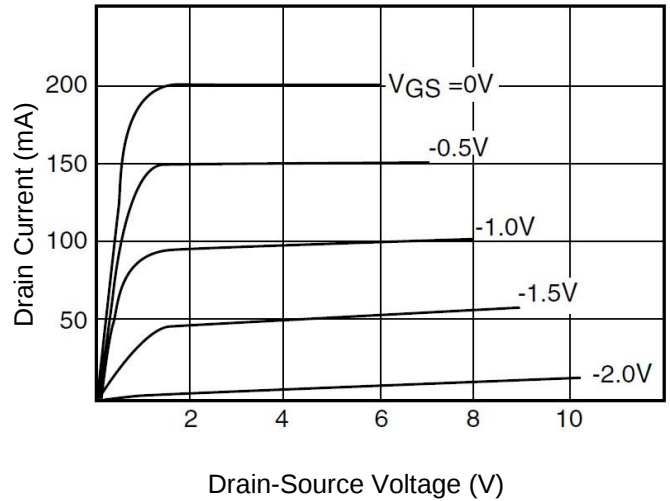
The chip must be enclosed in a hermetically sealed environment for optimum performance and reliability.

|                 |     |
|-----------------|-----|
| RoHS Compliance | Yes |
|-----------------|-----|

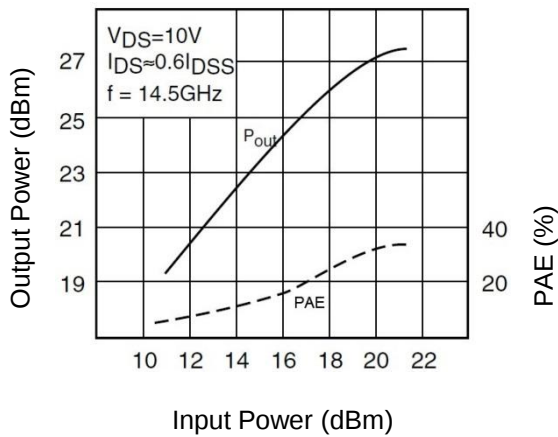
**POWER DERATING CURVE**



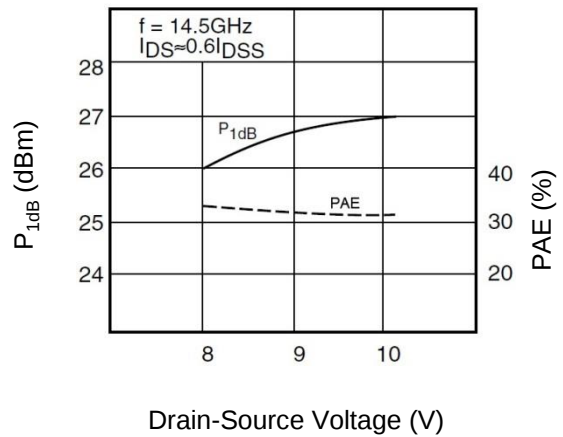
**DRAIN CURRENT vs. DRAIN-SOURCE VOLTAGE**



**OUTPUT POWER vs. INPUT POWER**



**P<sub>1dB</sub> & PAE vs. V<sub>DS</sub>**



### S-PARAMETERS

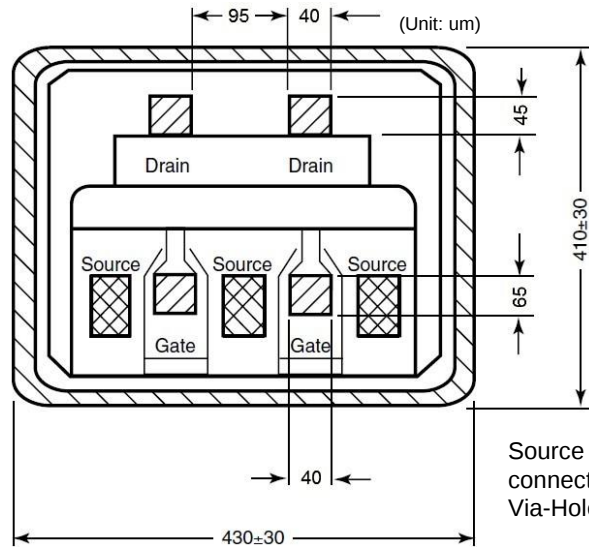
$V_{DS} = 10V, I_{DS} = 120mA$

| Freq<br>(MHz) | S11   |        | S21   |       | S12   |       | S22   |        |
|---------------|-------|--------|-------|-------|-------|-------|-------|--------|
|               | MAG   | ANG    | MAG   | ANG   | MAG   | ANG   | MAG   | ANG    |
| 100           | 1.000 | -6.4   | 6.959 | 175.9 | 0.004 | 86.4  | 0.500 | -3.0   |
| 500           | 0.989 | -31.3  | 6.696 | 159.7 | 0.020 | 72.5  | 0.488 | -14.6  |
| 1000          | 0.965 | -58.9  | 6.033 | 141.7 | 0.036 | 57.1  | 0.460 | -27.4  |
| 1500          | 0.940 | -81.4  | 5.262 | 126.6 | 0.046 | 44.7  | 0.430 | -37.7  |
| 2000          | 0.919 | -99.1  | 4.551 | 114.2 | 0.054 | 35.1  | 0.406 | -46.1  |
| 2500          | 0.904 | -113.1 | 3.952 | 103.9 | 0.058 | 27.4  | 0.389 | -53.2  |
| 3000          | 0.893 | -124.1 | 3.462 | 95.1  | 0.061 | 21.2  | 0.380 | -59.3  |
| 3500          | 0.885 | -133.2 | 3.062 | 87.2  | 0.063 | 16.1  | 0.376 | -65.0  |
| 4000          | 0.879 | -140.7 | 2.735 | 80.2  | 0.065 | 11.7  | 0.377 | -70.2  |
| 4500          | 0.875 | -147.0 | 2.464 | 73.7  | 0.065 | 7.9   | 0.380 | -75.2  |
| 5000          | 0.872 | -152.5 | 2.236 | 67.7  | 0.066 | 4.5   | 0.386 | -79.9  |
| 5500          | 0.870 | -157.4 | 2.043 | 62.0  | 0.066 | 1.5   | 0.394 | -84.5  |
| 6000          | 0.869 | -161.7 | 1.877 | 56.6  | 0.067 | -1.4  | 0.404 | -88.9  |
| 6500          | 0.868 | -165.6 | 1.733 | 51.4  | 0.067 | -4.0  | 0.414 | -93.1  |
| 7000          | 0.867 | -169.1 | 1.607 | 46.4  | 0.067 | -6.4  | 0.426 | -97.3  |
| 7500          | 0.867 | -172.4 | 1.496 | 41.5  | 0.067 | -8.8  | 0.438 | -101.3 |
| 8000          | 0.867 | -175.4 | 1.398 | 36.8  | 0.067 | -11.0 | 0.451 | -105.1 |
| 8500          | 0.867 | -178.3 | 1.309 | 32.1  | 0.066 | -13.1 | 0.464 | -108.9 |
| 9000          | 0.867 | 179.0  | 1.230 | 27.6  | 0.066 | -15.1 | 0.477 | -112.6 |
| 9500          | 0.867 | 176.5  | 1.158 | 23.2  | 0.066 | -17.1 | 0.490 | -116.1 |
| 10000         | 0.868 | 174.1  | 1.092 | 18.9  | 0.066 | -19.0 | 0.504 | -119.6 |
| 10500         | 0.868 | 171.8  | 1.032 | 14.6  | 0.065 | -20.8 | 0.517 | -123.0 |
| 11000         | 0.869 | 169.6  | 0.977 | 10.5  | 0.065 | -22.6 | 0.531 | -126.3 |
| 11500         | 0.870 | 167.5  | 0.927 | 6.4   | 0.064 | -24.4 | 0.544 | -129.5 |
| 12000         | 0.870 | 165.4  | 0.880 | 2.3   | 0.064 | -26.1 | 0.557 | -132.7 |
| 12500         | 0.871 | 163.4  | 0.836 | -1.7  | 0.064 | -27.8 | 0.570 | -135.8 |
| 13000         | 0.872 | 161.5  | 0.795 | -5.6  | 0.063 | -29.4 | 0.583 | -138.8 |
| 13500         | 0.873 | 159.6  | 0.758 | -9.4  | 0.063 | -31.0 | 0.596 | -141.8 |
| 14000         | 0.874 | 157.8  | 0.722 | -13.2 | 0.062 | -32.6 | 0.609 | -144.7 |
| 14500         | 0.875 | 156.1  | 0.689 | -16.9 | 0.061 | -34.1 | 0.621 | -147.6 |
| 15000         | 0.876 | 154.3  | 0.657 | -20.6 | 0.061 | -35.6 | 0.633 | -150.3 |
| 15500         | 0.877 | 152.6  | 0.628 | -24.2 | 0.060 | -37.1 | 0.645 | -153.1 |
| 16000         | 0.879 | 151.0  | 0.600 | -27.8 | 0.060 | -38.6 | 0.656 | -155.8 |
| 16500         | 0.880 | 149.4  | 0.574 | -31.3 | 0.059 | -40.0 | 0.667 | -158.4 |
| 17000         | 0.881 | 147.8  | 0.549 | -34.8 | 0.059 | -41.5 | 0.678 | -161.0 |
| 17500         | 0.882 | 146.3  | 0.525 | -38.2 | 0.058 | -42.9 | 0.689 | -163.5 |
| 18000         | 0.883 | 144.7  | 0.503 | -41.5 | 0.057 | -44.2 | 0.699 | -166.0 |
| 18500         | 0.885 | 143.2  | 0.482 | -44.8 | 0.057 | -45.6 | 0.709 | -168.4 |
| 19000         | 0.886 | 141.8  | 0.462 | -48.1 | 0.056 | -46.9 | 0.719 | -170.8 |
| 19500         | 0.887 | 140.3  | 0.442 | -51.3 | 0.055 | -48.2 | 0.728 | -173.2 |
| 20000         | 0.888 | 138.9  | 0.424 | -54.4 | 0.055 | -49.5 | 0.737 | -175.5 |

NOTE:\* The data includes bonding wires.

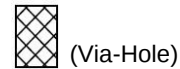
n: number of wires      Gate      n=2 (0.2mm length, 25um Dia Au wire)  
                                          Drain      n=2 (0.2mm length, 25um Dia Au wire)

### CHIP OUTLINE



Source electrodes are connected to the PHS by Via-Hole

Die Thickness:  $60 \pm 20 \mu\text{m}$



**■ BARE DIE INDEMNIFICATION**

All devices are DC probed and visually inspected at SEI, and non-compliant devices are removed. The RF electrical characteristics of the bare dice are warranted by the sampling inspection procedures. The standard sampling inspection procedure shall include the number of the sampling dice, position of the sampling dice in the wafer and RF electrical characteristics of the sampling dice measured in the test fixture. Customer shall understand that all the bare dice will not be 100% RF tested by SEI. It is the customer responsibility to verify performance of the devices.

Customer shall comply with the storage and handling requirements for condition and period of storage of the bare dice agreed by customer and SEI. Warranty will not apply when customer disregards the storage and handling requirements.

Warranty will not apply to the electrical characteristics and product quality to the bare dice after assembly by customer.

SEI will indemnify customer for warranty failures, provided however that the indemnification to customer shall be limited to supply of bare dice for substitution.

**CAUTION**

Sumitomo Electric Device Innovations, Inc. products contain **gallium arsenide (GaAs)** which can be hazardous to the human body and the environment. For safety, observe the following procedures:

- Do not put these products into the mouth.
- Do not alter the form of this product into a gas, powder, or liquid through burning, crushing, or chemical processing as these by-products are dangerous to the human body if inhaled, ingested, or swallowed.
- Observe government laws and company regulations when discarding this product. This product must be discarded in accordance with methods specified by applicable hazardous waste procedures.